TM 11-6625-604-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL

FREQUENCY CONVERTER CV-394/USA-5

HEADQUARTERS, DEPARTMENT OF THE ARMY

NOVEMBER 1966

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FOREWORD

Throughout this manual, reference is made to North Eastern Engineering Model 14–22C Frequency Converter which is a commercial designation and is identical with the CV–394/USA–5. Reference is also made to Frequency Counter series 14–20 which is identical with Frequency Meter AN/USM–26. This is a first-edition manual containing preliminary and unreviewed information compiled by the manufacturer of the equipment. Judicious caution should be exercised in using the information in this manual until it is replaced by a revised edition.

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TECHNICAL MANUAL
No. 11-6625-604-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *8 November 1966*

Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual
FREQUENCY CONVERTER CV-394/USA-5

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***This manual supersedes so much of TM 11-6625-604-12P, 16 March 1965, as pertains to basic issue items list and maintenance allocation chart.**

SECTION 1

INTRODUCTION

1-1. Index of Equipment Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to this equipment. DA Pam 310-4 is an index of current technical manuals, technical bulletins, supply manuals (type 7, 8, and 9), supply bulletins, lubrication orders, and modification work orders available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc.) and the latest changes to and revisions of each equipment publication.

1-2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71-4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting, by the individual user, of errors, omissions, and recommendations for improving this equipment manual is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting these improvements. This form will be completed by the use of pencil, pen, or typewriter and forwarded direct to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL-MR-NMP-AD, Fort Monmouth, N.J. 07703.

SECTION 2

GENERAL DESCRIPTION

2-1. General

a. The Model 14-22C Frequency Converter is used to extend the measuring range of series 14-20 Frequency Counters to frequencies from 100 to 220 megacycles. This unit is composed of a wavemeter to select the approximate frequency, a converter circuit to convert the signal being measured to one within the range of the frequency counter (less than 10 mc), and a two-stage video amplifier.

b. The unit is housed on a plug-in type chassis designed for installation on a series 14-20 Frequency Counter to form one convenient operating unit. A tuning eye is provided on the converter front panel to indicate either "in-tune" settings or voltage levels.

2-2. Technical Specifications

Frequency Range	100 to 220 mc
Minimum Input Voltage	0.1 volt rms
Input Impedance	Approximatey 50 ohms
Power Requirements	Furnished by counter
Reading	9 places: 2 on converter, 7 on counter
Accuracy	Same as counter
Mixing Frequencies Provided	Multiples of 10 mc from 100 to 220 mc, derived from counter 100 kc standard frequency
Dimensions	12 in. wide, 9 in. high, 8 in. deep

2-3. Tube Complement

Ref. sym.	*Tube type*	*Function*
V1201	6AH6	Harmonic Generator
V1202	5654	Harmonic Amplifier
V1203	5725	Mixer
V1204	6AH6	Video Amplifier
V1205	6AH6	Video Amplifier
V1206	6E5	Tuning Eye

SECTION 3

THEORY OF OPERATION

3-1. Theory

a. The Model 14-22C Frequency Converter is used to extend the range of the frequency counter. A wavemeter is used to indicate the correct mixing frequency, which is a multiple of 10 mc taken from the counter 100 kc standard frequency. When the correct mixing frequency is mixed with an unknown frequency, the difference of the frequencies is registered on the counter. The unknown frequency is the sum of the converter mixing frequency and the counter reading.

b. Function selector switch (MIXER—DIRECT —WAVEMETER) S1202 provides three important uses for the converter.

(1) It will mix an unknown signal with the selected frequency and provide the resultant.
(2) It will pass a signal of less than 10 mc directly to the counter for measurement.
(3) It will obtain an approximate measurement of the unknown signal to determine the proper mixing frequency.

3-2. Electron-Ray Tube

a. Electron-ray tube V1206 is used to indicate visually the effect of changes in controlling voltages. The tube consists of two main parts: (1) a triode operating as a dc amplifier and (2) an electron-ray indicator. The target is operated at a positive voltage, attracting electrons from the cathode. When the electrons strike the target, they produce a glow on the florescent coating of the target that appears as a ring of light.

b. When the potential of the ray-control electrode, mounted between the cathode and target, is less positive than the target, electrons flowing to the target are repelled and do not reach that portion of the target behind the electrode. Because the target does not glow where it is shielded from electrons, the control electrode casts a shadow on the glowing target that varies from approximately 90° to 0°. When the control electrode is approximately the same potential as the target, the shadow is 0°.

c. The control electrode potential is determined by the voltage on the grid of the triode section. Triode plate current flow through R1224 produces a voltage drop that determines the potential of the control electrode. When the voltage of the triode grid changes in the positive direction, plate current increases, control electrode potential decreases because of the increased drop across R1224, and the shaded area widens. The shadow narrows when the potential of the triode grid changes in the negative direction. Variable resistor R1223 is used to adjust the sensitivity of the tuning eye.

3-3. Function Selector Switch (Mixer—Direct—Wavemeter)

a. **MIXER position:** the MIXER position of the function selector switch is used to convert the input signal (within the 100 mc to 220 mc range) to a frequency within the range of the counter. The input signal is applied through C1220 directly to the control grid of mixer tube V1203. The mixing frequency is supplied by harmonic generator V1201.

b. The 10 mc signal generated in the counter is applied to the grid of the harmonic generator, operating as a Class C amplifier with an output rich in 10 mc harmonics. The 10 mc signal from the counter is resonated by C1210 in the converter and L301 (output from the time base) in the Gate Section of the counter.

c. MIXING FREQUENCY MC switch S1201 provides selection of 12 different frequencies in the 100 mc to 210 mc range from the harmonic generator and amplifier. S1201 is made up of sections A, B, and C mounted on a common shaft. Each section is made up of capacitors in the same range of values. These values, connected into three different LC circuits, provide the tuned circuits for the outputs of the harmonic generator and harmonic amplifier and the input to mixer tube V1203. The output of V1201

is coupled by C1211 to L1201 (comprising section A of the MIXING FREQUENCY MC switch). Voltage from this tuned circuit is applied to the grid of the harmonic amplifier. The amplified frequency is coupled by C1219 to L1202 and the capacitance applied by section B of S1201. This LC circuit is tuned to the same frequency as the tuned section following the harmonic generator. C1216 and L1204 are used in the circuit to suppress an unwanted mode of amplification from V1202. Coils L1202 and L1203 inductively couple the signal from the amplifier to mixer V1203. L1203 and the capacitance of section C of S1201 make up the tuned circuit for the mixer.

d. The difference signal to be passed to the counter is obtained by applying the signal from V1202 to the suppressor grid of V1203 while the input frequency is applied to the grid. The output of the mixer is connected to C1221 and L1205, a series peaking arrangement designed to pass only difference frequencies from 1 kc to 10.1 mc. This frequency is applied first to video amplifier V1204, another series peaking arrangement (C1224 and L1206), and to the second stage of amplifier V1205. The output of V1205 is applied to transformer T1201 and (1) passed to the function selector, then to the counter (through pin 4 of P1202), and (2) applied to tuning eye V1206 to determine the voltage level. If the level is below 1 volt, the shadow will widen. If it is above 1 volt the eye will close.

e. **DIRECT position:** the DIRECT position of the function selector switch passes the input signal (less than 10 mc) directly to the counter for measurement through pin 4 of P1202.

f. **WAVEMETER position:** the input signal is fed to the wavemeter circuit to obtain an approximate frequency measurement and to determine the proper mixing frequency to be used. The wavemeter circuit is adjustable, using variable capacitor C1231 in an LC circuit. The wavemeter dial is graduated in divisions of 10 mc each, from 100 mc to 220 mc. When the wavemeter is in resonance with the incoming signal, the tuning eye closes, indicating resonance is at this point.

g. Wavemeter output is coupled to the tuning eye through a voltage doubling circuit formed by diodes CR1201 and CR1202 and a low-pass filter composed of R1222, C1233, and C1234. An input voltage of at least 0.1 volt rms is necessary to actuate the tuning eye and to provide sufficient voltage to operate the counter.

SECTION 4

OPERATION

4-1. Installation

a. Connect the power cable of the frequency counter to a normal 115-volt, 50–60 cps, power source.

b. Throw the counter off/ON switch to the off position and insert the converter unit. Make certain that the snapslide fasteners are properly secured to the studs on the counter. The unit is then correctly coupled to the 8-contact and 16-contact connectors in the counter.

Note. The operator must be familiar with the use of the counter. Read the technical manual on counter operation before proceeding.

c. Throw the counter switch ON and allow 15 minutes for the circuits to stabilize.

4-2. Operating Procedure

a. Set the counter controls as follows:

FUNCTION SELECTOR switch to FREQUENCY position.

100 KC STD switch to INT. if the counter internal standard is being used, or to EXT. position if an external standard is being used.

b. Connect input signal to BNC connector (J1201) on the converter panel, marked INPUT. A signal of at least 0.1 volt is required.

c. Finding the mixing frequency:

(1) Throw the counter 100 KC STD. switch to EXT. This prevents unwanted coupling into the wavemeter circuit while tuning for unknown signals. Throw the converter function selector switch to WAVEMETER.

(2) Beginning at the lowest frequency position of the wavemeter dial, rotate the dial until the tuning eye indicates presence of a signal by the narrowing of the eye shadow. Adjust the dial for maximum closure of the eye.

(3) The position of the dial indicates the correct mixing frequency to be used. If the dial is on a dividing line between two frequency ranges, use the lower value for the mixing frequency. If a stable reading is not given on the counter, use the higher of the frequencies.

d. Mixing procedure:

(1) Turn converter function selector to MIXER position.

(2) Set MIXING FREQUENCY MC switch to frequency indicated by wavemeter dial in *c*(3) above. If the tuning eye is almost closed, sufficient voltage is present to operate the counter.

(3) Set the counter FREQUENCY UNIT switch and DISPLAY TIME control to the desired positions.

(4) The unknown input frequency will be the sum of the setting of the MIXING FREQUENCY MC switch and the reading on the counter.

e. Measuring frequencies up to 10 mc:

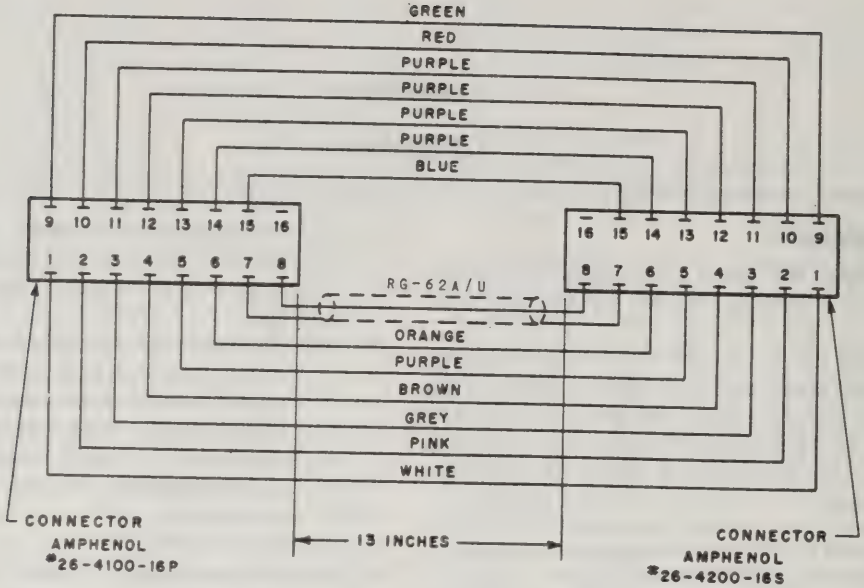
(1) Perform *a*, *b*, and *c* of paragraph 4–1, above.

(2) Perform *a* and *b*, above.

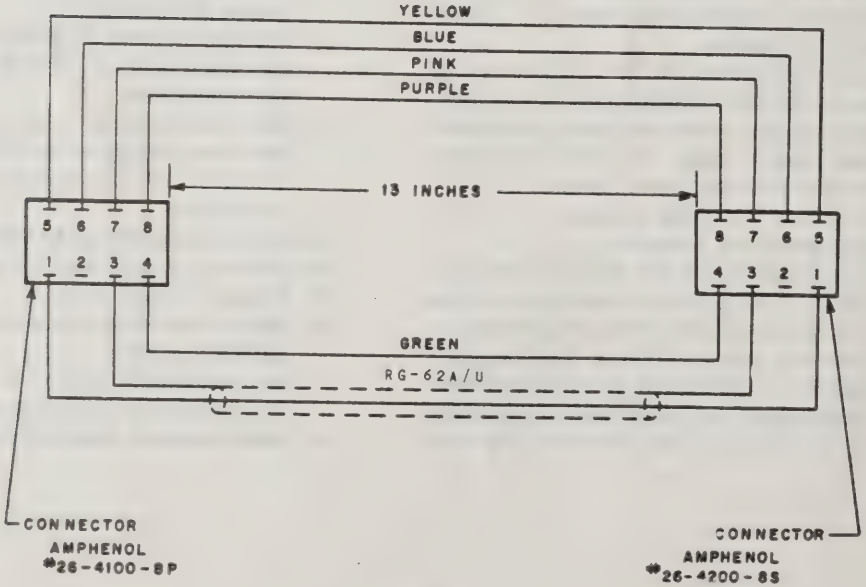
(3) Place converter function selector switch in DIRECT position.

(4) Set counter FREQUENCY UNIT switch and DISPLAY TIME control as desired.

(5) Read frequency directly from counter.



CA-28



CA-27

Figure 1. Fabrication Diagram for Cables CA-27 and CA-28

SECTION 5

MAINTENANCE

5-1. Tube Replacement

All tubes are accessible when the unit is removed from its plug-in position. Tubes, except for V1201, may be replaced with ones having the same characteristics. V1201 is critical and selection may be necessary to obtain a replacement tube that will operate satisfactorily over the entire frequency range of the unit (see 5-2, below). If adjustment is needed after replacement of V1201, V1202, V1203, or V1206, table 1 shows the applicable component.

Table 1

Tube	Adjustment
V1201	Capacitors in section A of MIXING FREQUENCY MC switch S1201.
V1202	Capacitors in section A and B of MIXING FREQUENCY MC switch S1201.
V1203	Capacitors in section C of MIXING FREQUENCY MC switch S1201.
V1206	Resistor R1223.

5-2. Replacement of Harmonic Generator V1201

Harmonic generator V1201 should be carefully selected so that all frequency ranges are available. Tubes that function properly in the middle ranges (140-170 mc) usually function well throughout the band. However, the tube should be checked out over the entire band.

5-3. Alignment of Harmonic Generator Circuit

a. Remove the converter from the counter. Connect cables CA-27 and CA-28 between the converter and connectors in the plug-in area of the counter. The cables can be purchased from Northeastern or constructed in accordance with figure 1.

b. Throw the counter switch to ON position and allow 15 minutes warmup time.

c. Set counter controls as follows:

FUNCTION SELECTOR.	FREQUENCY
FREQUENCY UNIT.	0.01
100 KC STD	INT.
DISPLAY TIME	fully counterclockwise

Set converter controls as follows:

MIXING FREQUENCY.	100
Function selector	MIXER

d. Connect a signal generator capable of supplying a frequency in the 100 to 200 mc range to the INPUT connector of the converter. Adjust the signal generator for an output of 105 mc with a 500-millivolt level.

e. Adjust C1264 on each of sections A, B, and C for maximum deflection of the tuning eye. If the eye is fully closed, reduce the voltage from the signal generator. The adjustments are interactive and should be repeated several times.

f. The counter reading should be approximately 5000 KC, depending upon the accuracy of the signal generator. The counter reading should increase with an increase in signal generator frequency.

g. Repeat the adjustment procedure using the following frequencies and control settings:

Signal generator	*Mixing frequency mc*	*Adjustment*
115	110	C1262
125	120	C1259
135	130	C1257
145	140	C1254
155	150	C1252
165	160	C1249
175	170	C1247
185	180	C1245
195	190	C1243
205	200	C1241
215	210	C1240

5-4. Video Amplifier Alignment

a. Repeat *a* through *c* of paragraph 5-3.

b. Connect signal generator to converter INPUT connector and set frequency to 110.1 mc. Adjust voltage output to approximately one-half closure of tuning eye.

c. Adjust L1205 and L1206 (fig. 2) for maximum closure of tuning eye.

5-5. Tuning Eye Calibration

a. Repeat *a* through *c* of paragraph 5-3.

b. Connect signal generator to converter INPUT connector and set to frequency of 102 mc.

c. Connect a high-impedance vacuum-tube voltmeter across R1221 (fig. 3). Adjust signal generator voltage output level for a reading of 1 volt on the voltmeter.

d. Adjust R1223 (fig. 2) so that tuning eye almost closes.

5-6. Adjustment of 10 Mc Input to Harmonic Generator

a. Throw counter power switch to off position and remove counter dust cover. Install the converter in the counter.

b. Throw counter power switch ON and set counter controls as follows:

FUNCTION SELECTOR.	FREQUENCY
FREQUENCY UNIT.	0.01
100 KC STD	INT.
DISPLAY TIME	fully counterclockwise

Set converter controls:

MIXING FREQUENCY MC.	210
Function selector	MIXER

c. Connect signal generator to converter INPUT connector and set to 220 mc.

d. Adjust the voltage level so that tuning eye is approximately half closed.

e. Adjust C1210 for maximum closure of tuning eye.

5-7. Adjustment of 360 Mc Mode Suppressor

Adjustment of the mode suppressor is factory set and should not need readjustment throughout the life of the instrument.

a. Set counter controls as follows:

FUNCTION SELECTOR.	FREQUENCY
FREQUENCY UNIT.	0.01
100 KC STD	INT.
DISPLAY TIME	fully counterclockwise

Set converter controls:

MIXING FREQUENCY MC.	100
Function selector	MIXER

b. Connect a signal generator to the converter INPUT connector and slowly vary the frequency from 350 mc to 400 mc. If the tuning eye shows a voltage is present, adjust L1204 (fig. 2) for zero voltage.

Troubleshooting

Test	Result	Possible trouble
Power ON	Tuning eye V1206 should glow.	*a.* Defective V1206. *b.* Shorted power leads. *c.* Defective circuit components.
Measure a known signal between 100 and 220 mcs.	Counter should display count.	*a.* Defective counter. See technical manual to correct defect. *b.* Defective converter, see below.
Measure voltage with VTVM across R1221 with function selector at MIXER and 10 mc—40 millivolt signal at INPUT.	VTVM should read 1 volt.	*a.* V1203, V1204 and/or V1205 defective. *b.* Defective mixer—video amplifier circuit components.
Measure voltage on pin 1 of V1201	Voltage should be −65v dc ±10%.	*a.* Counter defective. See counter technical manual. *b.* V1201 defective. *c.* C1209, C1210, and/or R1201 defective.
Correct voltage at pin 1 of V1201 but no count.		*a.* V1201, V1202 defective. *b.* Circuit components defective.
Power ON	Tuning eye glows but does not clear indication.	*a.* V1206 defective. *b.* Input diodes CR1201 and CR1202 defective. *c.* Circuit components defective.

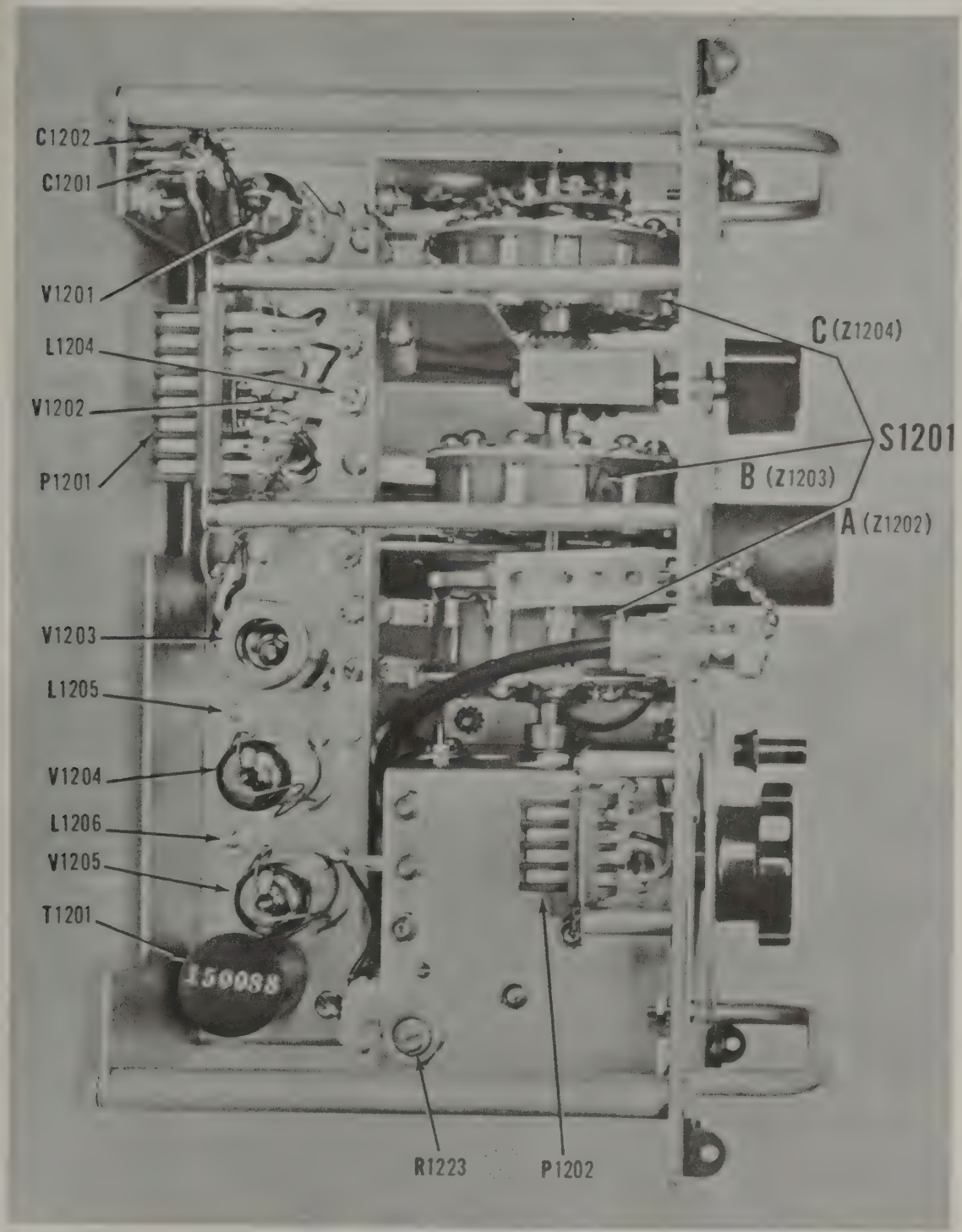


Figure 2. Bottom View, Model 14-22C Frequency Converter

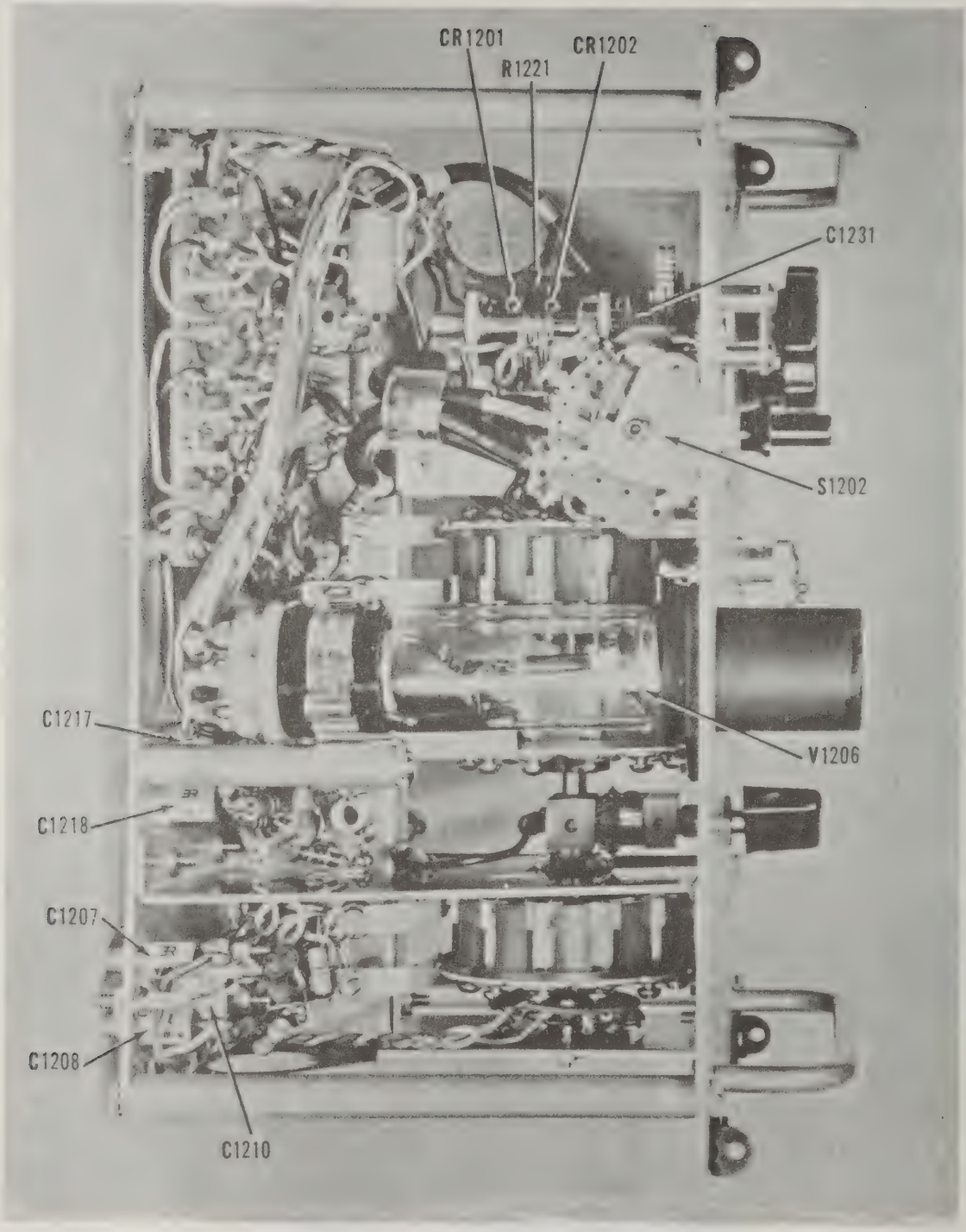


Figure 3. Top View, Model 14-22C Frequency Converter

SECTION 6

PREVENTIVE MAINTENANCE INSTRUCTIONS

6-1. Scope of Maintenance

The maintenance duties assigned to operator and organizational levels are listed below, together with a reference to the paragraphs covering the specific maintenance functions.

a. Daily preventive maintenance checks and services (para 6-4).

b. Weekly preventive maintenance checks and services (para 6-5).

c. Monthly preventive maintenance checks and services (para 6-6).

d. Quarterly preventive maintenance checks and services (para 6-7).

e. Cleaning (para 6-8).

f. Touchup painting (para 6-9).

6-2. Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 6-3 through 6-9 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (para 6-4 through 6-7) outline functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat-serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the charts indicate what to check, how to check, and what the normal conditions are; the *References* column lists the illustrations, paragraphs, or manuals that contain detailed repair or replacement procedures. If the defect cannot be remedied by the corrective actions listed, higher level maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

6-3. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of the equipment are required daily, weekly, monthly, and quarterly.

a. Paragraph 6-4 specifies the checks and services that must be accomplished daily (or at least once each week if the equipment is maintained in standby condition).

b. Paragraphs 6-5, 6-6, and 6-7 specify *additional* checks and services that must be performed weekly, monthly, and quarterly.

6-4. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Completeness	See that the equipment is complete (appx B)	None.
2	Exterior surfaces	Clean the exterior surfaces (para 6-8).	
3	Connectors	Check the tightness of all connectors.	
4	Controls and indicators	While making the operating check (sequence No. 5), observe that the mechanical action of each knob, dial, and switch is smooth, and free of external or internal binding, and that there is no excessive looseness.	
5	Operation	Operate the equipment according to section 4.	

6-5. Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Cables	Inspect cords, cables, and wires for chafed, cracked, or frayed insulation. Replace connectors that are broken, arced, stripped, or worn excessively.	
2	Handles and latches	Inspect handles for looseness. Replace or tighten as necessary.	
3	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion. Clean and touch up paint as required (para 6-9).	Para 6-9.

6-6. Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Pluckout items	Inspect seating of pluckout items. Make certain that tube sockets grip tubes bases tightly.	None.
2	Jacks	Inspect jacks for snug fit and good contact.	
3	Transformer terminals	Inspect terminals on the transformers. There should be no evidence of dirt or corrosion.	
4	Terminal blocks	Inspect terminal blocks for loose connections and cracked or broken insulation.	
5	Resistors and capacitors	Inspect resistors and capacitors for cracks, blistering, or other defects.	
6	Variable capacitors	Inspect variable capacitors for dirt, corrosion, and deformed plates.	
7	Interior	Clean interior of chassis and cabinet.	

6-7. Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Publications	See that all publications are complete, serviceable, and current.	DA Pam 310-4.
2	Modifications	Check DA Pam 310-4 to determine whether new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	TM 38-750 and DA Pam 310-4.
3	Spare parts	Check all spare parts (operator and organizational) for general condition and method of storage. No overstock should be evident, and all shortages must be on valid requisitions.	Appx B.

6-8. Cleaning

Inspect the exterior of the equipment. The exterior surfaces should be free of dust, dirt, grease, and fungus.

a. Remove dust and loose dirt with a clean soft cloth.

***Warning:* Cleaning Compound (FSN 7930-395-9542) is flammable and its fumes are toxic. Provide adequate ventilation. *Do not* use near a flame.**

b. Remove grease, fungus, and ground-in dirt from the cases; use a cloth dampened (not wet) with cleaning compound.

c. Remove dust or dirt from plugs and jacks with a brush.

d. Clean the front panel and control knobs; use a soft clean cloth. If dirt is difficult to remove, dampen the cloth with water; mild soap may be used for more effective cleaning.

6-9. Touchup Painting Instructions

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in TM 9-213.

Figure 4. Schematic, 100 to 220 Mc Frequency Converter

(Located in back of manual)

APPENDIX A

REFERENCES

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Type 7, 8, and 9), Lubrication Orders, and Modification Work Orders.
TM 38-750	Army Equipment Record Procedures.
TM 9-213	Painting instructions for field use.

APPENDIX B

BASIC ISSUE ITEMS

Section I. INTRODUCTION

B-1. General

This appendix lists items for Converter, Frequency, Electronic CV-394/USA-5, the component items comprising it, and the items which accompany it, or are required for installation, operation, or operator's maintenance.

B-2. Explanation of Columns

An explanation of the columns in section II is given below.

a. Source, Maintenance, and Recoverability Codes (col 1).

(1) *Source code (col 1a).* The selection status and source for the listed item is noted here. The source code used is—

Code	*Explanation*
P—	Applies to repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories

(2) *Maintenance code (col 1b).* The lowest category of maintenance authorized to install the listed item is noted here. The maintenance code used is as follows:

Code	*Explanation*
C—	Operator/Crew

(3) *Recoverability code (col 1c).* Not used.

b. Federal Stock Number (col 2). The Federal stock number for the item is indicated in this column.

c. Description (col 3). The Federal item name, a five-digit manufacturer's code, and a part number are included in this column.

d. Unit of Issue (col 4). The unit used as a basis of issue (e.g. ea, pr, ft, yd, etc.) is noted in this column.

e. Quantity Incorporated in Unit Pack (col 5). Not used.

f. Quantity Incorporated in Unit (col 6). The total quantity of the item used in the equipment is given in this column.

g. Quantity Authorized (col 7). The total quantity of an item required to be on hand and necessary for the operation and maintenance of the equipment is given in this column.

h. Illustration (col 8).

(1) *Figure number (col 8a).* The number of the illustration in which the item is shown appears in this column.

(2) *Item or symbol number (col 8b).* The call out number used to reference the item in the illustration appears in this column.

B-3. Federal Supply Codes

This paragraph lists the Federal supply code with the associated manufacturer's name.

Code	*Manufacturer*
81349—	Military Specifications

Section II. BASIC ISSUE ITEMS LIST

(1)			(2)	(3)	(4)	(5)	(6)	(7)	(8) Illustrations	
(a) Source code	(b) Maint. code	(c) Rec. code	Federal stock No.	Description	Unit of issue	Qty inc in unit pack	Qty inc in unit	Qty auth	(a) Figure No.	(b) Item or symbol No.
			6625–866–5381	CONVERTER, FREQUENCY, ELECTRONIC CV–394/USA–5.	ea	------	------	------	2, 3	
			ORD thru AGC	TECHNICAL MANUAL TM 11–6625–604–15. *Note.* For technical manuals the quantity indicates the maximum number of copies authorized for packing (or issue) with the equipment. Where a number of these equipments are concentrated in a small area, the quantity on hand may be reduced to practical levels. Excess publications must be returned to publication supply centers through AG channels.	ea	------	1	1		
P	C	------	5960–166–7667	ELECTRON TUBE: 81349; 6AH6	ea	------	3	1	2	V1201, V1204, V1205
P	C	------	5960–262–1357	ELECTRON TUBE: 81349; 5654/6AK5W.	ea	------	1	1	2	V1202
P	C	------	5960–237–6917	ELECTRON TUBE: 81349; 5725/6AS6W.	ea	------	1	1	2	V1203
P	C	------	5960–188–3968	ELECTRON TUBE: 81349 6E5	ea	------	1	1	3	V1206

APPENDIX C

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for Converter, Frequency, Electronic CV-394/USA-5. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Explanation of Format for Maintenance Allocation Chart

a. Group Number. Group numbers correspond to the reference designation prefix assigned in accordance with ASA Y32.16, Electrical and Electronics Reference Designations. They indicate the relation of listed items to the next higher assembly.

b. Combat Assembly Nomenclature. This column lists the item names of component units, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Maintenance Function. This column indicates the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

Code	*Maintenance category*
C	Operator/Crew
O	Organizational Maintenance
F	Direct Support Maintenance
H	General Support Maintenance
D	Depot Maintenance

d. Tools and Equipment. The numbers appearing in this column refer to specific tools and equipment which are identified by these numbers in section III of this appendix.

e. Remarks. Self explanatory.

C-3. Explanation of Format for Tool and Test Equipment Requirements

The columns in the tools and test equipment requirements chart are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment columns of the MAC. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number.

e. Tool Number. Not used.

Section II. MAINTENANCE ALLOCATION CHART

Group No.	Component assembly nomenclature	Maintenance functions											Tools and equipment	Remarks
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
	CONVERTER, FREQUENCY, ELECTRONIC CV-394/USA-5.	C	H	C	C	H	H				H	D	2, 3, 4, 5, 6, 7, 9 12 3, 4, 5, 10 1, 2, 3, 4, 5, 6, 10 10 1, 2, 3, 4, 5, 6, 7, 8, 10, 11	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

Tools and equipment	Maintenance category	Nomenclature	Federal stock No.	Tool No.
1	H, D	GENERATOR, PULSE AN/PPM-1A	6625-504-9603	
2	H, D	GENERATOR, SIGNAL AN/USM-44A	6625-669-4031	
3	H, D	MULTIMETER ME-26D/U	6625-913-9781	
4	H, D	MULTIMETER TS-352B/U	6625-553-0142	
5	H, D	OSCILLOSCOPE AN/USM-140	6625-987-6603	
6	H, D	TEST SET CRYSTAL RECTIFIER TS-268E/U	6625-669-1215	
7	H, D	TEST SET, POWER, ELECTRICAL TS-914/U	6625-542-1289	
8	D	TEST SET, ELECTRON TUBE TV-2C/U	6625-669-0263	
9	H	TEST SET, ELECTRON TUBE TV-7D/U	6625-820-0064	
10	H, D	TOOL KIT, RADAR AND RADIO REPAIRMAN TK-100/G	5180-605-0079	
11	H, D	TRANSFORMER, VARIABLE CN-16B/U	5950-235-2086	
12	C	Tools and test equipment available to repairman-user because of his assigned mission.	5950-235-2086	

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

USASA (2)
CNGB (1)
OCC-E (7)
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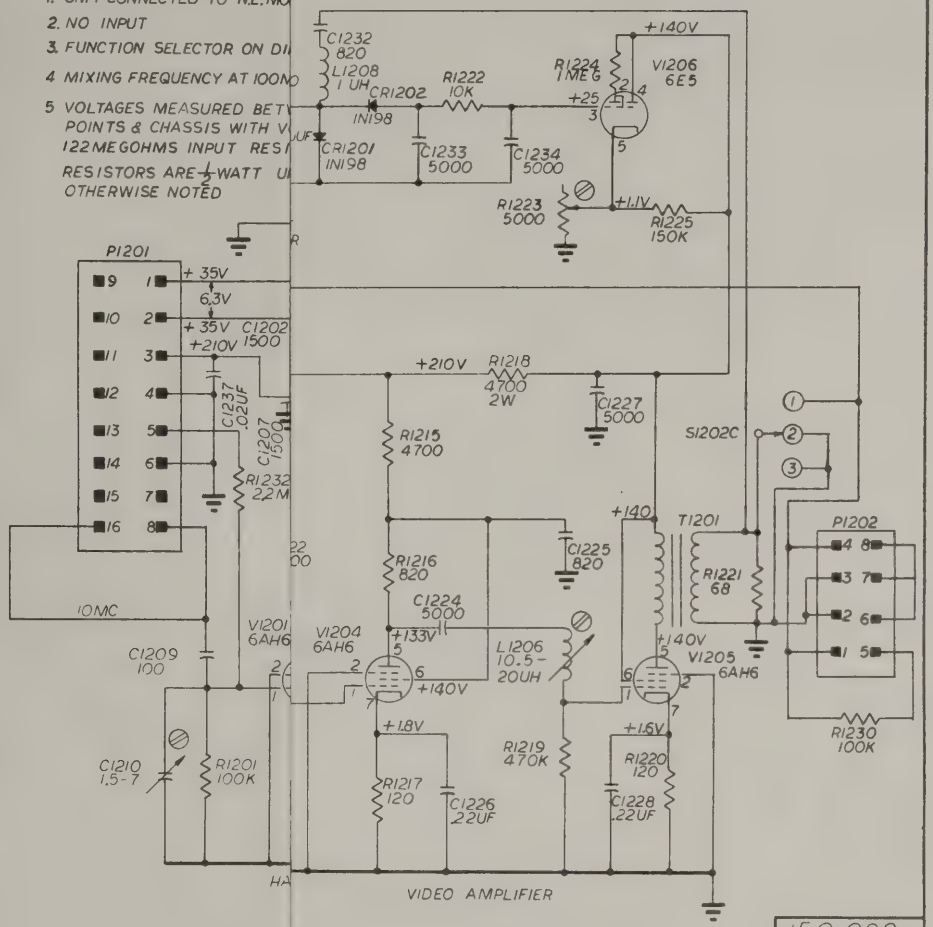
CofEngrs (1)
TSG (1)
CofSptS (1)
USAARENBD (2)
USACDCEA (1)
USACDCCBRA (1)
USACDCCEA (1)
USACDCCEA Ft Huachuca (1)
USACDCOA (1)
USACDCQMA (1)
USACDCTA (1)
USACDCADA (1)
USACDCARMA (1)
USACDCAVNA (1)
USACDCARTYA (1)
USACDCSWA (1)
USAMC (5)
USCONARC (5)
ARADCOM (5)
ARADCOM Rgn (2)
OS Maj Comd (4)
LOGCOMD (2)
USAMICOM (4)
USASTRATCOM (4)
USAESC (85)
MDW (1)
Armies (2)
Corps (2)
USAC (3)
318th USASA Bn (5)
Svc Colleges (2)
USASCS (10)
USASESCS (5)
USAADS (2)
USAAMS (2)
USAARMS (2)
USAIS (2)
USAES (2)
USATC Armor (2)
USATC Engr (2)
USATC Inf (2)
USASTC (2)
WRAMC (1)
Army Pic Cen (2)
USACDCEC (10)
Instl (2) except
Ft Gordon (10)
Ft Huachuca (10)
WSMR (5)
Ft Carson (25)
Ft Knox (12)
Army Dep (2) except
LBAD (20)
SAAD (35)
TOAD (14)
LEAD (7)
SHAD (3)
NAAD (5)
SVAD (5)
CHAD (3)
ATAD (10)
GENDEPS (2)
Sig Sec GENDEPS (5)
Sig Dep (12)
Sig FLDMS (2)
AMS (1)
USAERDAA (10)
USAERDAW (13)
USACRREL (2)
USAEPG (10)
Units org under fol TOE's
(2 cys each):
11-7
11-57
11-97
11-98
11-117
11-157
11-158
11-500 (AA-AC, RO)
11-587
11-592
11-597

NG: State AG (3).
USAR: None.
For explanation of abbreviations used, see AR 320-50.

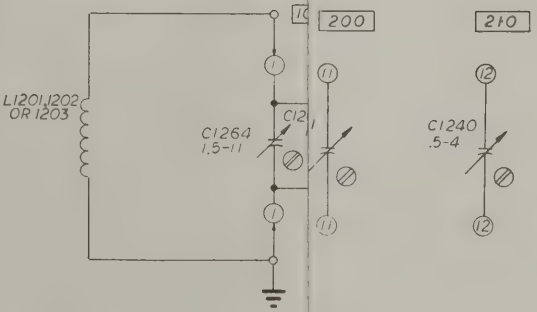
☆ U.S. Government Printing Office: 1966—250505

NOTES
CONDITIONS OF DC VOLTAGE MEA

1. UNIT CONNECTED TO N.E.MO
2. NO INPUT
3. FUNCTION SELECTOR ON DI
4. MIXING FREQUENCY AT 100NO
5. VOLTAGES MEASURED BET POINTS & CHASSIS WITH V 122 MEGOHMS INPUT RESI RESISTORS ARE 1/2 WATT U OTHERWISE NOTED



150 082



NOTES
CONDITIONS OF DC VOLTAGE MEASUREMENT

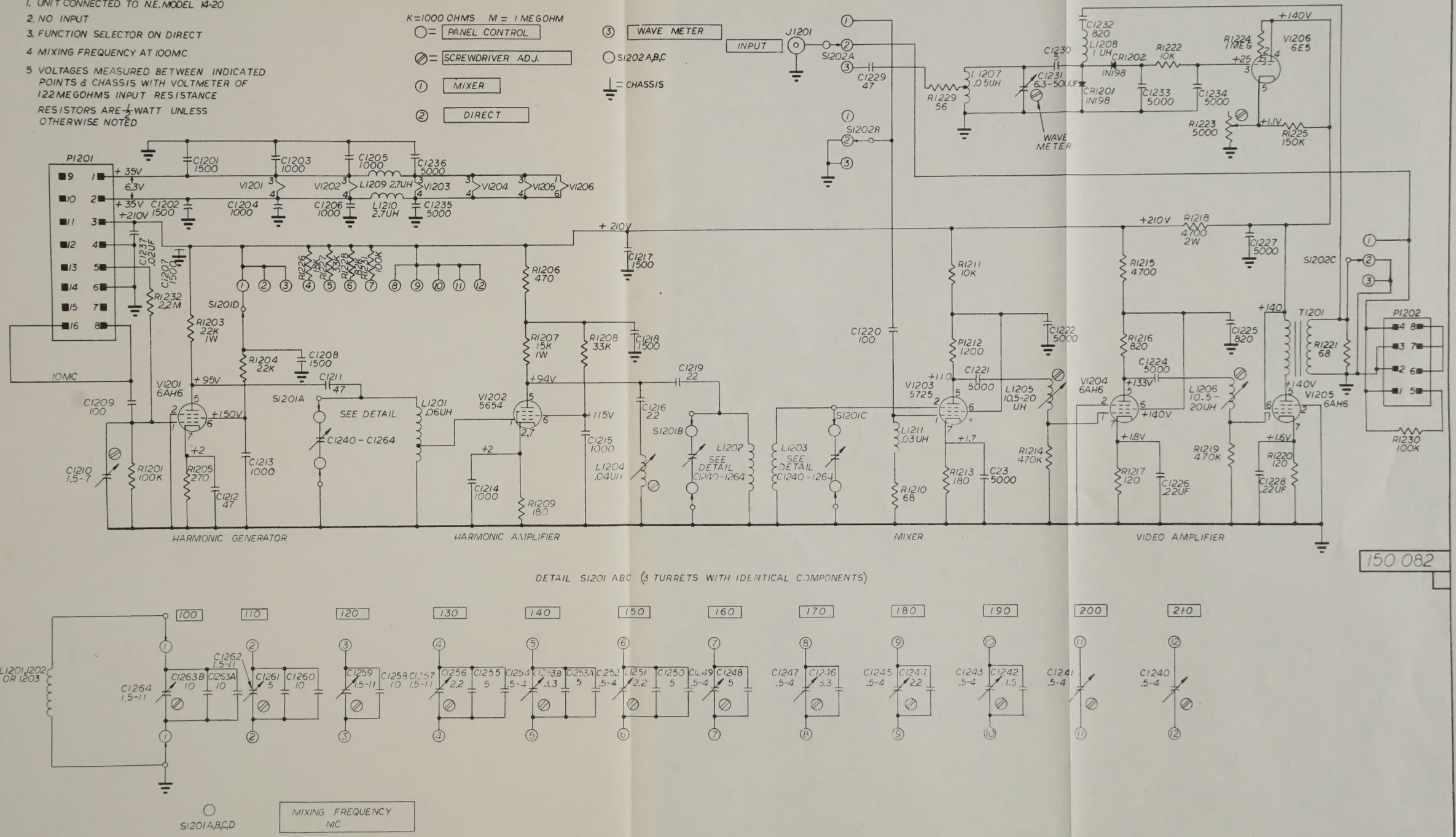
1. UNIT CONNECTED TO N.E. MODEL 14-20
2. NO INPUT
3. FUNCTION SELECTOR ON DIRECT
4. MIXING FREQUENCY AT 100MC
5. VOLTAGES MEASURED BETWEEN INDICATED POINTS & CHASSIS WITH VOLTMETER OF 122 MEGOHMS INPUT RESISTANCE

RESISTORS ARE 1/2 WATT UNLESS OTHERWISE NOTED

CAPACITANCE IN UUF, RESISTANCE IN OHMS UNLESS OTHERWISE SPECIFIED

K=1000 OHMS M = 1 MEGOHM

○ = PANEL CONTROL
⊘ = SCREWDRIVER ADJ.
① MIXER
② DIRECT
③ WAVE METER
○ S1202A,B,C
⏚ = CHASSIS



150 082

DETAIL S1201 ABC (3 TURRETS WITH IDENTICAL COMPONENTS)

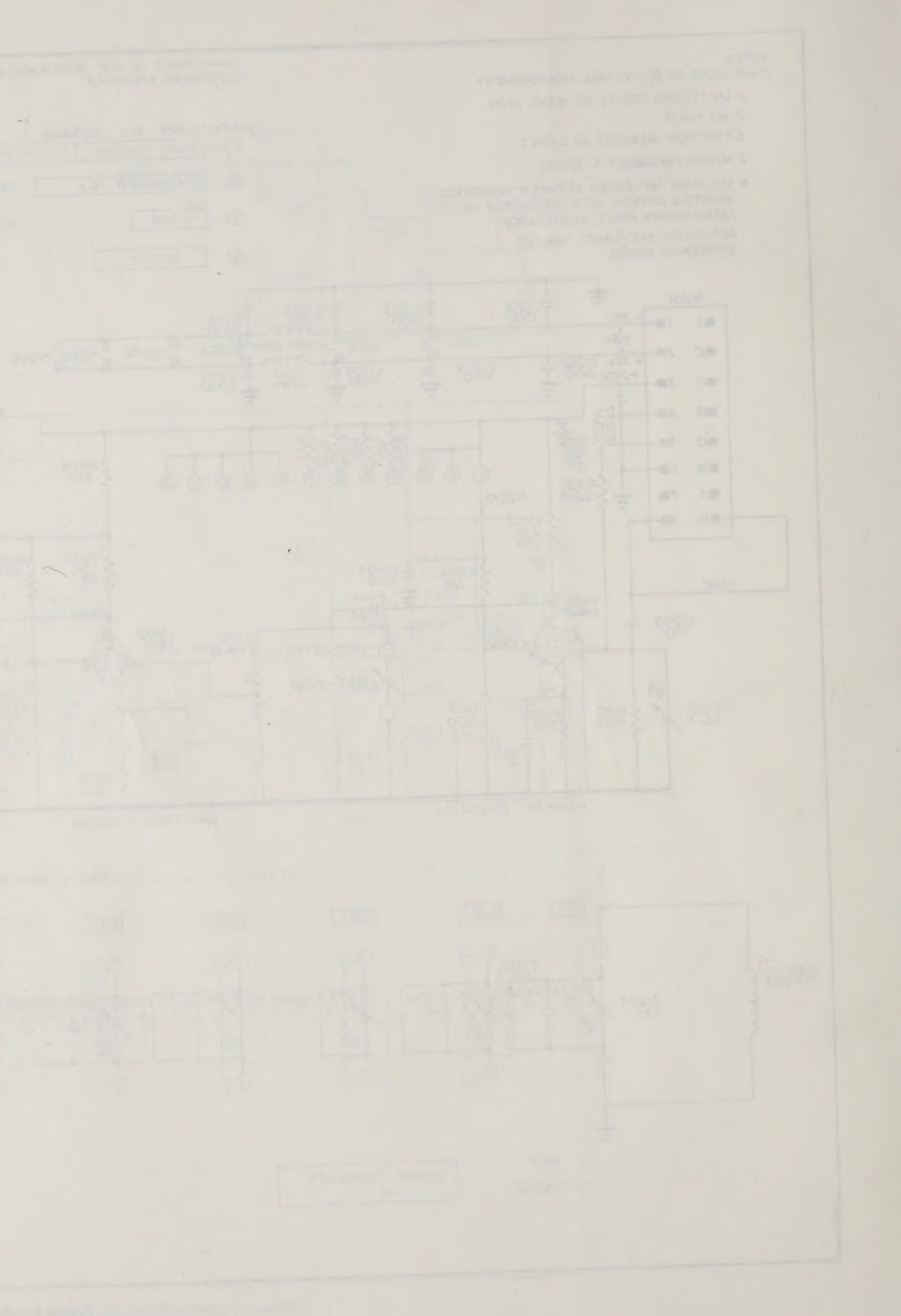



Figure 4. Schematic, 100 to 220 Mc Frequency Converter